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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/529,877

10/16/2006

Yasuaki Takeuchi

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EXAMINER

WALKER, KEITH D

ART UNIT

PAPER NUMBER

1726

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/529,877	<b>Applicant(s)</b> TAKEUCHI ET AL.	
	<b>Examiner</b> KEITH WALKER	<b>Art Unit</b> 1726	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 December 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1 and 4-13 is/are pending in the application.
- 4a) Of the above claim(s) 4 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 5-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/10/10 has been entered.

### ***Remarks***

Claims 1 & 5-13 are amended and pending examination as discussed below.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. Claims 1 & 5-13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Regarding claim 1, the limitation is drawn to a solid electrolyte membrane that consists of one or plural kinds of layered silicate minerals. As such, the claim limits

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the membrane to only one or plural kinds of layered silicate minerals. The instant specification describes the layered silicate mineral as "a proton conductive inorganic material under a suitable condition." (page 5) The silicate mineral is further described as being used as a suitable electrolyte if "the density and impregnated liquid contents are properly controlled" (pages 5 and 6). However, the instant disclosure does not teach what "impregnated liquids" are envisioned by the inventor or how to control the unknown liquids. No direction is provided by the inventors as to what suitable liquid contents are required or suitable to make or use a solid electrolyte with any of the possible combinations of layered silicate minerals. The breadth of the claims is broader than the description of the instant specification. The instant claims are drawn to plural kinds of layered silicate minerals. An undue amount of experimentation would be required since a number of unknown variables exist such as the method of creating the solid electrolyte that consists of layered silicate minerals and the factors or data that are used to control the density and liquid contents for all the different kinds of silicate minerals both individually and combined, as claimed. The instant disclosure does not properly describe the invention in such a manner to enable one of ordinary skill in the art to make or use the invention as claimed.

2. Claims 1 & 5-13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the

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invention. Regarding claim 1, the solid electrolyte is claimed as "consist[ing] of" layered silicate minerals; however, the closest description in the specification to a working example saturates the bentonite in an aqueous solution of sodium chloride. The sodium chloride is described as a support electrolyte and therefore the closed claimed language is not supported by the specification.

3. Claims 1 & 5-10 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for bentonite with the claimed density, does not reasonably provide enablement for the other three claimed silicate minerals or a combination of the layers. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims. The specification provides an example of the claimed density for the mineral bentonite but does not teach or provide examples as how the density relates to the other claimed minerals. The other minerals are from different silicate groups and have different formulas with different crystalline structures and the method of using or making an electrolyte with the silicate minerals other than bentonite is not taught. No direction in making or using the claimed minerals is provided for the breadth of the claimed invention.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1 & 5 are rejected under 35 U.S.C. 102(b) as being anticipated by US 3,266,940 (Caesar).

5. Claims 1 & 5 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 93/08613 (Krumpelt).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1 & 5-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 3,266,940 (Caesar).

Caesar teaches a fuel cell with an anode, cathode and solid electrolyte membrane consisting of a layered aluminosilicate mineral (Fig. 1; 1:1-30, 1:35-40, 1:70-2:10). An example of the electrolyte material is mordenite and the electrolyte membrane may or may not have a support structure (2:25-45, 3:5-20, 4:10-20).

Caesar is silent to the silicate mineral being one of montmorillonite, beidellite, illite and sericite. However, it is well known in the art that common aluminosilicates

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used in fuel cell electrolytes include montmorillonite and beidellite. Therefore it would be obvious to one skilled in the art at the time of the invention to use one of the common minerals known in the art. Furthermore, it would be obvious to alter the density of the mineral layers to alter the ion exchange capability to improve the function of the fuel cell.

Caesar is silent to anode, cathode and water separators.

However, these features are well known in the art for the efficient operation of the fuel cell system. The anode and cathode separators are known for distributing fuel and oxidant across the electrode surface and are usually conductive to electrically connect the electrodes together producing a fuel cell stack with a particular electrically arrangement. The water separator is used for maintaining an appropriate operating temperature for the fuel cell stack. A coolant is channeled through the water separator and then through a heat exchanger to keep the fuel cell from overheating.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the fuel cell of Caesar with the anode, cathode and water separators because these elements are well known in the art and are used for their known purpose. Combining prior art elements according to known methods to yield predictable results and using known techniques to improve similar devices in the same way are considered obvious to one of ordinary skill in the art (KSR, MPEP 2141 (III)).

Regarding the limitations to the type of fuel used to operate the fuel cell, these limitations are directed to the intended method of operating the fuel cell and do not

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further limit the physical structure of the claimed product. It is held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from the prior art apparatus satisfying the claimed structural limitations (MPEP 2114). Furthermore, all of the claimed fuels are known fuels for the intended use with a fuel cell.

### ***Response to Arguments***

Applicant's arguments with respect to the amended claims have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEITH WALKER whose telephone number is (571)272-3458. The examiner can normally be reached on Mon. - Fri. 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Keith Walker/  
Primary Examiner, Art Unit 1726